Chapter Two

AIRPORT MARKET ANALYSIS

The previous chapter provided basic background information pertaining to existing airport facilities, the metropolitan airport system, local aircraft ownership, regional and local socioeconomic indicators, and general characteristics of the potential airport siting area. The next step is to examine the market potential for an airport in the Maricopa area.

This chapter examines this potential by first reviewing the markets of other general aviation airports in the metropolitan area with regards to operations and mission, services and products, business use, as well as constraints to operations. The analysis will then turn specifically to the Maricopa market to consider local market constraints, opportunities, and potential niches. A forecast of potential aviation activity is included that will be used to estimate the type of airport facilities that would be necessary. The facility requirements will then be used to provide a preliminary estimate of the cost of a facility which can then be compared to the revenues that can be generated for consideration of economic feasibility.

EXISTING MARKET DESCRIPTIONS

The airports currently located within a 17-mile radius of Maricopa were generally described in the previous chapter. As indicated in the previous chapter, the majority of the local airfields are generally restricted from public use. They include farm and

ranch airstrips, as well as other airfields used primarily in support of agricultural operations. One airport is used exclusively for pilot training. This chapter looks further into the public use airports in the area to examine their markets and the niches they serve.

ESTRELLA SAILPORT

Estrella Sailport is the closest public use airport to Maricopa. It is located immediately north of SR 238, six miles west of the intersection of SR 238 and SR 347 in Maricopa. The facility is located on land leased from the Arizona State Land Department, and is owned and operated by Arizona Soaring, Inc.

As the name suggests, the airport is dedicated almost exclusively to aerial soaring. Arizona Soaring, Inc. offers pilot training from Federal Aviation Administration (FAA) certified glide instructors for Private to Advanced Aerobatics ratings. The company also offers sailplane rides to the general public. They maintain a fleet of seven single-place gliders, eight two-place gliders, and three tow-planes. The airport also has tie-down and hangar storage available for sailplane owners.

Estrella Sailport is an internationally recognized gliderport that takes advantage of its location and weather in serving the recreational soaring market. The airport is located close to the Phoenix metropolitan area, but is outside of Class B airspace. The sunny and warm Arizona weather maximizes the conditions conducive to sailing. The location at the foot of the Estrella Mountains provides excellent opportunities for ridge and wave flying nearby.

PHOENIX REGIONAL AIRPORT

Phoenix Regional Airport was privately developed as part of a 2,000 acre master planned community. The original vision for the airport was to combine the market nuances of Scottsdale Airport and Stellar Airpark at one location with both residential and industrial access to the airfield.

The current facility does have a small industrial park with airfield access, but the residential airpark has yet to evolve. The airport has recently been sold to the Ak Chin Indian Community. The future of the facility is unknown as indications are that leases are not currently being renewed.

GILA RIVER MEMORIAL

Gila River Memorial Airport is an airport facility located approximately four miles southwest of downtown Chandler. The facility was constructed in 1942 by the Department of Defense, but is now owned by the Gila River Indian Community. Due to the poor condition of the airfield, Memorial Airport has been closed to public operations; however, several users still exist. According to the most recent 5010 Airport Master Record for Memorial Airport, the airport has 61 based aircraft, including 31 single engine aircraft and 30 multi-engine aircraft. This number may be exagger-

ated as the most recent airport master plan inventoried based aircraft at 17 in 2003.

The airport's 8,560-foot runway is sufficient for jet aircraft, but would first need to be rehabilitated. The airport has seven enclosed executive hangars used for based aircraft storage and two large conventional hangars used for maintenance operations. Each of these hangars is privately owned. The current occupancy rate is estimated at 100 percent. The airport's 80,000 square yard apron is heavily deteriorated and has no tie-down facilities. Several aircraft are parked on the apron permanently. There are no public fueling services at the airport. Individual operators provide their own fuel for their operations.

There is currently a single aviation business located on the airport. Biegert Aviation utilizes DHC-7 aircraft for air cargo and air charter activities, and operates out of a large conventional hangar. International Air Services used to operate C-130 aircraft for aerial firefighting operations at Memorial Airport but have recently relocated their operations to another airport due to the poor airfield conditions.

Unless major rehabilitation projects are undertaken in the short-term that allow the airport to be re-open to public-use, it will be difficult for Memorial Airport to attract aircraft to the airport. Competing airports in the region include Sky Harbor International Airport, Mesa Falcon Field, Williams Gateway, Stellar Airpark, Chandler Municipal Airport, and Casa Grande. Each of these facilities is presently better equipped to accommodate aircraft operations into the future.

The most recent master plan was prepared in 2003 and recommended abandoning the existing runway and constructing a new primary Runway 13-31. A shorter parallel runway was also planned to accommodate potential small general aviation aircraft training operations. Landside recommendations included a terminal facility, as well as several hangar facilities. Large areas for potential commercial and industrial development were also reserved. At this point in time, none of the recommendations from the master plan have been implemented.

Due to its close location near Interstate 10, Memorial Airport could readily serve as a general aviation reliever to Sky Harbor International Airport; however, facilities would need to be refurbished and improved to accomplish this. The primary constraint facing Memorial Airport is its complicated property ownership and management issues. Until these issues can be resolved, little investment in the airport can be expected.

CASA GRANDE MUNICIPAL AIRPORT

The Casa Grande Municipal Airport is located approximately four miles north of downtown Casa Grande. The *National Plan of Integrated Airport Systems* (NPIAS) classifies Casa Grande Municipal Airport as a public-use general aviation airport.

Casa Grande is equipped with a single runway measuring 5,200 feet in length and 100 feet in width. According to the most current 5010 Airport Master Record, Casa Grande has 101 total based aircraft, including ten ultralights. Operations are estimated at 98,000 annually. The vast majority of these operations are local general aviation operations. Due to the fact that Casa Grande is equipped with a precision instrument landing system (ILS) approach combined with its location outside of the Class B airspace around Phoenix, many training operations are performed here on a daily basis.

The airport currently rents out 52 T-hangars, 18 shade hangars, 50 tie-down spaces, a commercial hangar, and a flight school building. Four conventional hangars have also been privately developed on leased land. There is currently a waiting list for those wishing to rent a hangar facility at Casa Grande. The airport's terminal building was built in 2001 and provides office space, restrooms and showers, flight planning area, conference room, and a fuel service desk. Fueling services are provided by the City.

There is an industrial park located adjacent to the airport that was originally developed with taxiway access. However, the park was released from the airport and parcels are now sold rather than leased. Any airport access from the park would now require a "through-the-fence" agreement that would have to be approved by the FAA.

The Casa Grande Municipal Airport should continue to experience growth in based aircraft and general aviation operations due to the population growth in the Casa Grande area. While the airport is preparing to update its master plan, the current plans include extending the runway to an ultimate length of 8,540 feet. A 2002 economic impact study indicated that the Casa Grande Municipal Airport employed 28 people with a payroll of 1.1 million dollars and a total sales activity of 2.5 million dollars.

STELLAR AIRPARK

Stellar Airpark is a privately owned and operated airport located in Chandler that has successfully developed both residential and industrial airpark. The residential airpark is located on the west side of the airport, and includes gated taxiways into a series of residential lots complete with adjacent or attached aircraft "garages." The east side of the runway also includes taxiway access in an aviation business park setting.

The airport is also open to public use with a fixed base operator (FBO), Stellar Air, providing fuel and aircraft maintenance. The runway length of 3,913 feet is not conducive to significant corporate aircraft activity, but sufficient for the private aircraft and small aviation businesses that thrive there. The airport has 152 based aircraft with an estimated 39,000 annual operations. Local operations are estimated at nearly 80 percent of the traffic.

CHANDLER MUNICIPAL AIRPORT

Chandler Municipal Airport is located approximately three miles southeast of downtown Chandler. The airport has been owned and operated by the City of Chandler since its acquisition in 1948. Chandler Municipal Airport is currently classified as a reliever airport in the NPIAS.

Chandler Municipal Airport is equipped with a parallel runway system. The longest runway is currently 4,870 feet in length and 75 feet in width. This is capable of handling most small general aviation aircraft and limited business jet aircraft.

According to the current 5010 Airport Master Record, there are 449 based aircraft at Chandler Municipal Airport. Airport traffic control tower (ATCT) records indicate the airport experienced 269,072 operations in 2006. Over 67 percent of these operations were local general aviation operations. This high percentage of local operations can be attributed to the four flight training operators at the airport who provide fixed-wing aircraft flight instruction as well as helicopter flight training.

The airport has four FBO tenants. Chandler Air Service provides a wide array of services, including aircraft fuel, flight training, aircraft rental, maintenance, and aircraft sales. Chandler Aviation conducts aircraft maintenance and repair services. A sub-tenant of Chandler Aviation is Sunbird Flight School, who provides flight training services. Venture Aviation provides flight training and aircraft maintenance services. Quantum Helicopters' main service is flight training; however, they also conduct charter and aerial photography operations.

Landside facilities at Chandler Municipal Airport include approximately 116 T-hangars, approximately 10 conventional hangars, and 20-shade hangars. The 90,500 square-yard apron is equipped with 122 aircraft tie-down spaces. A terminal building provides areas for flight planning, restrooms, passenger waiting, office space, and administration facilities.

Chandler Municipal Airport drives economic activity for the City of Chandler. Employment at the airport was estimated at 160 people in 2002 with over six million dollars in payroll and almost 14.1 million in sales. Chandler Airpark is planned adjacent to the airport and could potentially boost local economic activity. This airpark provides areas for all kinds of business development in an enterprise zone, which allows for tax incentives.

The recent master plan recommends extending the primary runway to a length of 5,700 feet. Development encroachment limits the ability to extend the runway any further. This length would allow the airport to accommodate some additional business jet activity and create more economic potential for the airport and the community.

POTENTIAL MARKET NICHES

Based upon the market description of the other public use airports in the area, as well as the assets and constraints of the Maricopa area, several opportunities or niches can be identified. These include:

- Pilot Training – This is a significant business in the Phoenix metropolitan area, taking advantage of the high percentage of visual weather the area experiences.

- Recreational Aviation – This is a niche already being served locally by the Estrella Sailport.

- Industrial Airpark – Stellar Airpark and Phoenix Regional Airport were privately developed to be both residential and industrial airparks. Casa Grande Municipal and Chandler Municipal Airports have business parks developing adjacent to them.

- Corporate Aviation – To date, other than Williams Gateway Airport, no airport on the south side of the Phoenix metropolitan area has developed a true niche of serving corporate clientele on a level comparable to Scottsdale Municipal Airport.

The four niches described above each take advantage of assets available in the Maricopa area. There are numerous flight school companies throughout the Valley offering not only private pilot rating, but commercial ratings as well. Some schools have contracts with foreign airlines and countries for the initial flight training of their future pilots. The Maricopa area's location outside of the Phoenix Class B airspace would be attractive for pilot training as already evidenced by the training activity at Casa Grande Municipal Airport and at Mobile Airport. One potential concern with an extensive flight training program would be the military training route that crosses almost directly over Maricopa.

A recreational airport would tend to cater to the smaller general aviation users as well as the glider activity now being served by Estrella Sailport. A strictly recreational airport, while valuable in attracting visitors to the area, would be limited on its ability to attract business and industry to the community. Depending upon the site location, however, this is a use that might need to be incorporated into the future airport.

An industrial airpark would provide an attraction for business use as well as an employment center. In its planning to date, the City of Maricopa has viewed the area around the Estrella Sailport as a potential employment center.

Ideally, an industrial airpark would be planned with taxiway access to available sites. Private airports such as Stellar Airpark and Phoenix Regional Airport have an advantage in this area because they can subdivide and sell lots with airport access. At federally obligated public airports, direct airfield access from privately owned property is considered "through-the-fence" and discouraged by the FAA.

The demand for industrial lots on leased property is generally lower.

As indicated above, corporate aviation is a niche that has presently not been truly developed on the south central side of the Phoenix metropolitan area. With the exception of Gila River Memorial Airport, which is presently not open for public use, the longest runway among the area public use airports is 5,200 feet at Casa Grande Municipal Airport. The closest runways currently capable of accommodating a full range of corporate jet traffic on a regular basis are at Sky Harbor International Airport, Williams Gateway Airport, and Phoenix Goodyear Airport. Chandler Municipal Airport has plans to extend its runway to a maximum length of 5,700 feet, but this will still serve only limited corporate jet activity. Casa Grande Municipal Airport's current approved airport layout plan does include a runway extension of 3,000 feet.

As a growing community, Maricopa's airport development interests should focus first on facilities that can grow with the community. This should include serving local aircraft that will grow with population, as well as corporate aircraft that serve the diversification of the area as an employment base. The ability to develop a business or industrial park either on or adjacent to the airport would be a plus.

If necessary, the airport should also consider the existing recreational uses in the area. This could result in an ultimate design that has a primary runway designed for corporate aircraft use. A second parallel runway could be developed for flight training with an adjacent dirt strip for use by glider aircraft. Flight patterns would be maintained on opposite sides of the airfield as would corporate and recreational landside activities.

AVIATION FORECASTS

With an indication of the market potentials, the next step is to quantify the potential demand for the airport use in the form of aviation activity. The primary indicators of general aviation demand include:

- Based aircraft
- Annual operations
- Fleet mix

The following subsections examine the activity that a new general aviation airport in the Maricopa area could expect to attract based upon today's aviation community and future growth potential. The analysis begins with an examination of the outlook for the general aviation industry on a national level.

NATIONAL GENERAL AVIATION TRENDS

Each year, the FAA updates and publishes a national aviation forecast. Included in this publication are forecasts for the large air carriers, regional/ commuter air carriers, general aviation, and FAA workload measures. The forecasts are prepared to meet budget and planning needs of the constituent units of the FAA and to provide information that can be used by

state and local authorities, the aviation industry, and the general public.

The current edition when this chapter was prepared was FAA *Aerospace Forecasts - Fiscal Years 2007-2020*, published in March 2007. The forecasts use the economic performance of the United States as an indicator of future aviation industry growth. Similar economic analyses are applied to the outlook for aviation growth in international markets.

In the seven years prior to the events of September 11, 2001, the U.S. civil aviation industry experienced unprecedented growth in demand and profits. The impacts to the economy and aviation industry from the events of 9/11 were immediate and significant. The economic climate and aviation industry, however, has been on the recovery.

The Office of Management and Budget (OMB) expects the U.S. economy to continue to grow in terms of Gross Domestic Product (GDP) at an average annual rate of 2.9 percent through 2020. The world GDP is forecast to grow at an even faster rate of 3.1 percent over the same period. This will positively influence the aviation industry, leading to passenger, air cargo, and general aviation growth throughout the forecast period (assuming there will be no new successful terrorist incidents against either U.S. or world aviation).

Following more than a decade of decline, the general aviation industry was revitalized with the passage of the *General Aviation Revitalization Act* in 1994, which limits the liability on general aviation aircraft to 18 years from the date of manufacture. This legislation sparked an interest to renew the manufacturing of general aviation aircraft due to the reduction in product liability, as well as renewed optimism for the industry. The high cost of product liability insurance had been a major factor in the decision by many American aircraft manufacturers to slow or discontinue the production of general aviation aircraft.

The sustained growth in the general aviation industry slowed considerably in 2001, negatively impacted by the events of September 11. Thousands of general aviation aircraft were grounded for weeks due to no-fly zone restrictions imposed on operations of aircraft in security-sensitive areas. This, in addition to the economic recession that began in early 2001, had a negative impact on the general aviation industry. General aviation shipments by U.S. manufacturers declined for three straight years from 2001 through 2003.

Stimulated by an expanding U.S. economy as well as accelerated depreciation allowances for operators of new aircraft, general aviation staged a relatively strong recovery with over ten percent growth in each of the last three years.

Resilience being demonstrated in the piston aircraft market offers hope that the new aircraft models are attracting interest in the low-end market of general aviation. The introduction of new, light sport aircraft is expected to provide further stimulation in the coming years.

New models of business jets are also stimulating interest for the high-end of the market. The FAA still expects the business segment to expand at a faster rate than personal/sport flying. Safety and security concerns combined with increased processing time at commercial terminals make business/corporate flying an attractive alternative. In addition, the bonus depreciation provision of the President's economic stimulation package began to help business jet sales late in 2004.

In 2006, there were an estimated 226,422 active general aviation aircraft in the United States. **Exhibit 2A** depicts the FAA forecast for active general aviation aircraft. The FAA projects an average annual increase of 1.4 percent through 2020, resulting in 274,914 active aircraft. Piston-powered aircraft are expected to grow at an average annual rate of 0.4 percent. This is driven primarily by a 5.7 percent annual increase in piston-powered rotorcraft and growth in experimental and sport aircraft, as single engine fixed wing piston are projected to increase at just 0.3 percent annually, and multi-engine fixed wing piston aircraft are projected to decrease by 0.2 percent per year. This is due, in part, to declining numbers of multi-engine piston aircraft, and the attrition of approximately 1,500 older piston aircraft annually. In addition, it is expected that the new, light sport aircraft and the relatively inexpensive microjets will dilute or weaken the replacement market for piston aircraft.

Owners of ultralight aircraft could begin registering their aircraft as "light sport" aircraft in 2005. The FAA estimates there will be a registration of 5,600 aircraft by 2010, and then grow to 13,200 aircraft by 2020.

Turbine-powered aircraft (turboprop and jet) are expected to grow at an average annual rate of 3.6 percent over the forecast period. Even more significantly, the jet portion of this fleet is expected to double in size in 12 years, with an average annual growth rate of 6.0 percent. The total number of jets in the general aviation fleet is projected to grow from 10,032 in 2006, to 22,797 by 2020.

At the October 2006 workshop sponsored by the FAA and the Transportation Research Board, industry experts suggested that the market for the new, very light jet (VLJ), or microjets, could add 500 more aircraft a year to the fleet by 2010. These twin-engine jets are expected to be priced between $1 million and $2 million, and are believed to have the potential to redefine business jet flying with the capability to support a true on-demand air taxi business service. The FAA forecast assumes that microjets will begin to enter the active fleet in 2007, with 350 new aircraft. After this year's introduction, they are forecast to grow by 400 to 500 aircraft per year, contributing a total of 6,300 aircraft to the jet forecast by 2020.

AIRPORT SERVICE AREA

The initial step in determining aviation demand for an airport is to define its generalized service area for the various segments of aviation the airport can accommodate. The airport service area is determined primarily by evaluating the location of compet-

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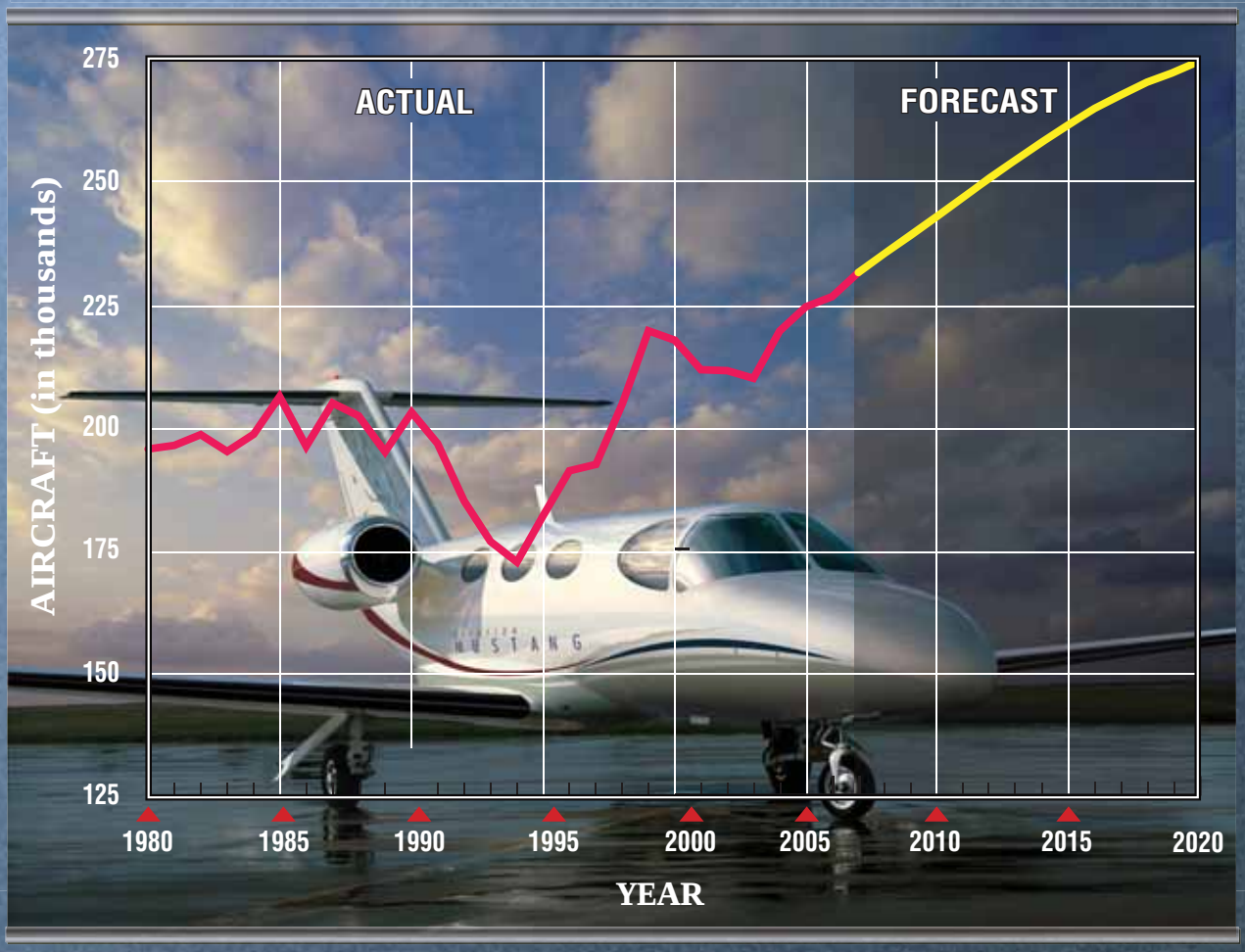
U.S. ACTIVE GENERAL AVIATION AIRCRAFT



U.S. ACTIVE GENERAL AVIATION AIRCRAFT (in thousands)

Year	FIXED WING				ROTORCRAFT		Experimental	Sport Aircraft	Other	Total
	PISTON		TURBINE							
	Single Engine	Multi-Engine	Turboprop	Turbojet	Piston	Turbine				
2006 (Est.)	148.2	19.4	8.0	10.0	3.4	5.9	24.5	0.4	6.6	226.4
2010	150.4	19.2	8.2	13.4	4.8	6.5	27.7	5.6	6.8	242.8
2015	154.0	19.0	8.5	18.0	6.3	7.2	31.1	10.5	6.7	261.4
2020	155.6	18.8	8.8	22.8	7.4	7.9	33.9	13.2	6.6	274.9

Source: FAA Aerospace Forecasts, Fiscal Years 2007-2020.

Notes: An active aircraft is one that has a current registration and was flown at least one hour during the calendar year.

Exhibit 2A
U.S. ACTIVE GENERAL AVIATION
AIRCRAFT FORECASTS

ing airports, their capabilities and services, and their relative attraction and convenience. With this information, a determination can be made as to how much aviation demand would likely be accommodated by a specific airport. It should be recognized that aviation demand does not necessarily conform to political or geographical boundaries.

As in any business enterprise, the more attractive the facility is in services and capabilities, the more competitive it will be in the market. If an airport's attractiveness increases in relation to nearby airports, so will the size of the service area. If facilities are adequate and rates and fees are competitive at the proposed airport, some level of general aviation activity might be attracted to the airport from beyond the immediate surrounding areas.

An inventory of nearby general aviation airports was previously outlined in Chapter One, including 18 restricted use airports and public use airports such as Estrella Sailport, Phoenix Regional, Gila River Memorial, Casa Grande Municipal, Stellar Airpark, and Chandler Municipal. The primary service area for the proposed airport will be generally defined by the proximity to the other general aviation public use airports.

As mentioned previously, the airport siting area is located mainly to the west and south of the City of Maricopa. **Exhibit 2B** depicts the primary service area. It is defined to the north and northeast by the Gila River Indian Community, and the service areas of Chandler Municipal Airport and Stellar Airpark to the east and southeast by Casa Grande Municipal Airport; to the northwest by Phoenix Goodyear Airport; and to the south and west by the Sonoran National Monument.

AIRCRAFT REGISTRATIONS

The number of aircraft based at an airport is, to some degree, dependent upon the nature and magnitude of aircraft ownership in the local service area. In addition, a new Maricopa airport would be one of several airports serving the general aviation needs in Pinal and Maricopa Counties. Therefore, the process of determining based aircraft potential begins with a review of historical and forecast aircraft registrations in the area.

Table 1G in the previous chapter outlined the historic registered aircraft in Pinal County since 1997. This information was obtained from records of the FAA's Aircraft Registry. There were a reported 276 aircraft registered in Pinal County in 1997. This number has since increased, with 356 registered aircraft reported in the County in 2006, which represents an annual average growth rate of 2.6 percent. This is more than double the national average of 1.2 percent growth for U.S. active aircraft during the same period. National growth coincides not only with the improved general economic conditions of the period, but also the enactment of the *General Aviation Revitalization Act*, which was approved by Congress in 1994 and sparked new aircraft manufacturing. There are no

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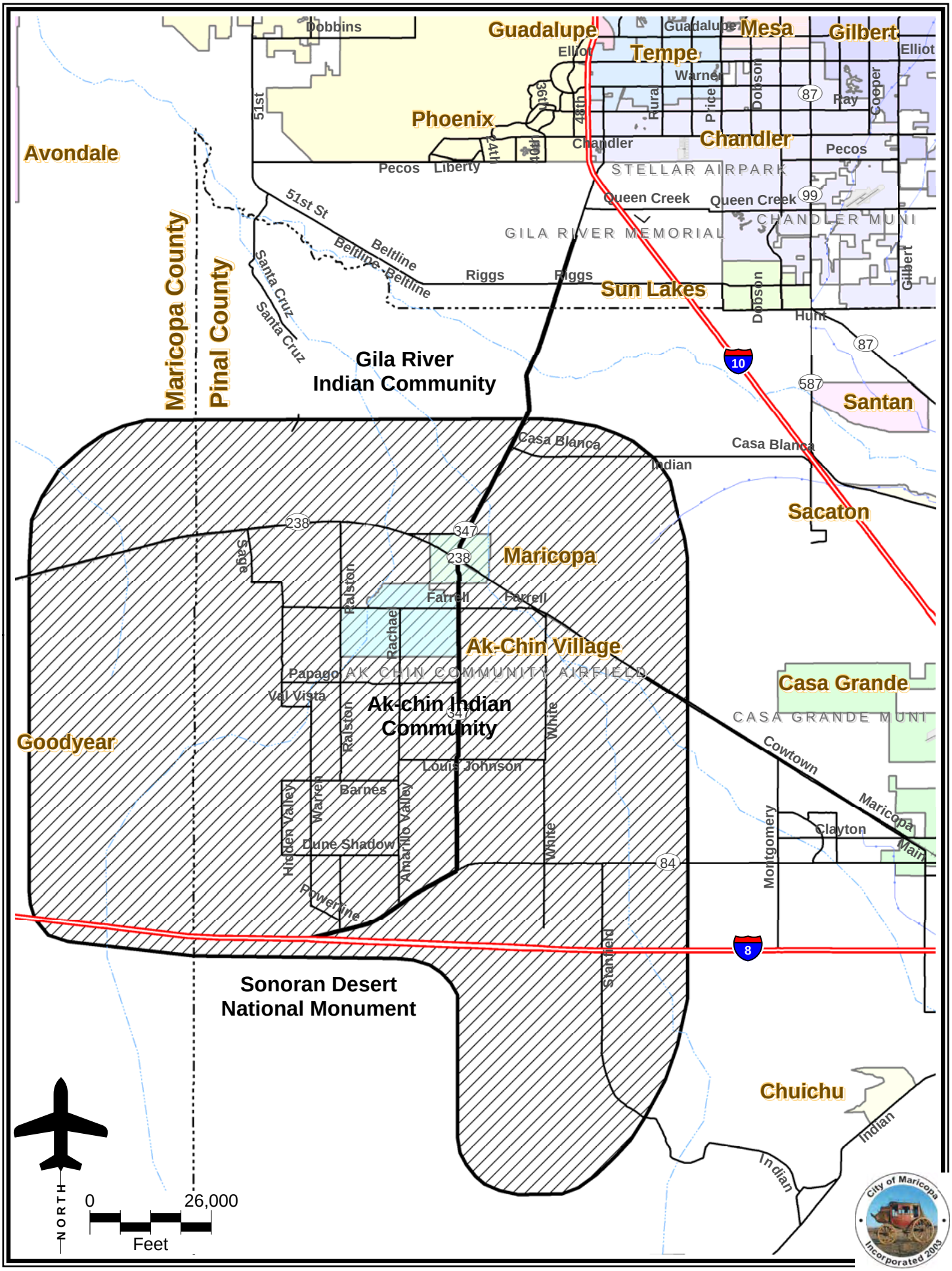

Exhibit 2B
GENERAL SERVICE AREA

other recently prepared forecasts of registered aircraft to examine and compare. As a result, a projection of county registrations was developed for this study.

Several analytical techniques were examined for their applicability to projecting registered aircraft in Pinal County. These included time-series extrapolation, regression analyses, and market share analyses.

A time-series analysis of registered aircraft in the County was prepared based upon the historic data gathered between 1997 and 2006. A regression analysis was also performed to compare the relationship of registered aircraft to population. Both of these resulted in a correlation coefficient (r^2) of less than 0.90. The correlation coefficient (Pearson's "r") measures the association between changes in the dependent variable (enplanements) and the independent variable(s) (calendar years). An r^2 greater than 0.90 indicates good predictive reliability. A value below 0.90 may be used with the understanding that the predictive reliability is lower. Being below the 0.90 threshold, neither the time-series analysis or regression analysis was considered reliable enough to define long-term registered aircraft in Pinal County. Therefore, other methods were used to develop projections of registered aircraft.

Table 2A outlines the history of registered aircraft in Pinal County in relation to the total active general aviation aircraft in the United States. While the County's market share decreased initially in 1998, it has increased since 2000 and was at 0.164 percent in 2006. A constant market share was applied to the projections of U.S active general aviation aircraft and yields 450 registered aircraft in Pinal County by 2025.

The population of Pinal County was also used as a comparison with registered aircraft in the County. The forecast examines the history of registered aircraft as a ratio of residents in Pinal County. As shown in **Table 2A**, the 2006 estimated population for the County was 286,795, resulting in a ratio of 1.24 registered aircraft per 1,000 residents. Maintaining the current ratio would yield a projection of 2,430 registered aircraft in Pinal County by 2025.

However, the ratio has been declining since 1997, when there were 1.75 registered aircraft per 1,000 residents in the County. Because of this declining ratio in Pinal County over the past ten years, the ratio of registered aircraft to population was also examined in the adjacent larger metropolitan counties of Maricopa and Pima. As shown in **Table 2B**, both counties have a higher ratio than Pinal County, but also experienced a decline in the ratio between 1995 and 2006.

This suggests that a larger population has a higher propensity for registered aircraft. Population growth rates in the three-county area, however, will remain stronger than aircraft demand. Thus, the aircraft ownership per capita will still decline over time.

The selected forecast for registered aircraft in Pinal County is based upon

a slowly decreasing ratio of registrations per 1,000 residents. The selected forecast yields 500 registered aircraft by 2010, 790 registered aircraft by 2015, and 1,950 registered aircraft by 2025. This represents a 9.4 percent average annual growth rate. **Table 2A** summarizes the registered aircraft forecasts developed for Pinal County, as well as the selected forecast.

TABLE 2A
Registered Aircraft Projections
Pinal County

Year	Pinal Co. Registered Aircraft	U.S. Active GA Aircraft	% of U.S. Active GA Aircraft	Pinal Co. Population	AC Per 1,000 Residents
1997	276	192,414	0.143%	157,758	1.75
1998	267	204,711	0.130%	164,765	1.62
1999	292	219,464	0.133%	172,083	1.70
2000	305	217,533	0.140%	179,727	1.70
2001	305	211,447	0.144%	194,285	1.57
2002	307	211,244	0.145%	210,022	1.46
2003	305	209,606	0.146%	227,034	1.34
2004	327	212,390	0.154%	245,425	1.33
2005	335	214,591	0.156%	265,304	1.26
2006	356	216,835	0.164%	286,795	1.24
Constant Market Share of U.S. Active GA Aircraft					
2010	385	234,000	0.164%	415,600[2]	0.92
2015	410	248,100	0.164%	696,300[2]	0.58
2025	450	274,500[1]	0.164%	1,954,000	0.23
Constant Registrations Per Capita					
2010	515	234,000	0.220%	415,600[2]	1.24
2015	865	248,100	0.348%	696,300[2]	1.24
2025	2,430	274,500[1]	0.884%	1,954,000	1.24
Decreasing Registrations Per Capita (Selected Forecast)					
2010	500	234,000	0.213%	415,600[2]	1.20
2015	790	248,100	0.317%	696,300[2]	1.13
2025	1,950	274,500[1]	0.712%	1,954,000	1.00

Source: Historical Registered Aircraft - Aviation Goldmine CD (1997-2000); Avantex Aircraft & Airmen CD (2001-2006); Historical & Forecast U.S. Active GA Aircraft – FAA Aerospace Forecasts, 2006-2017. Historical Population – U.S. Census Bureau; Forecast Population - Pinal County Small Area Transportation Study (August 2006).
[1] Extrapolated
[2] Interpolated

TABLE 2B
Registered Aircraft Per Capita

	1995	2000	2006
Pinal County			
Registered Aircraft	304	305	356
Population	144,627	194,285	286,795
Registered AC Per 1,000 Residents	2.10	1.57	1.24
Maricopa County			
Registered Aircraft	4,050	4,632	5,299
Population	2,551,765	3,072,149	3,764,446
Registered AC Per 1,000 Residents	1.59	1.51	1.41
Pima County			
Registered Aircraft	1,135	1,247	1,341
Population	776,172	843,746	980,977
Registered AC Per 1,000 Residents	1.46	1.48	1.37

The distribution of registered aircraft in the Maricopa area was also examined in Chapter One. Exhibit 1P and Table 1L depicted this distribution by community and zip code. Distribution of aircraft to the new Maricopa airport was made based upon proximity to the Maricopa planning area. **Exhibit 2B** depicts the general service area for the new Maricopa airport. In zip codes that are located within the primary service area, two of three registered aircraft were assigned to the new airport. In zip codes on the fringe of the primary service area, ten percent of the registered aircraft were assigned to the new airport. The result was a potential for an initial basing of 54 aircraft at a new airport were it to open today.

The number of based aircraft is the most basic indicator of general aviation demand. By first developing a forecast of based aircraft, the growth of aviation activities at the airport can be projected.

This baseline number of 54 based aircraft at the new Maricopa airport represents 15.2 percent of the total aircraft registered in Pinal County in 2006. An increasing market share forecast was developed and is presented in **Table 2C**. This increasing market share forecast assumes that with the projected boom in the population, the airport will begin capturing a greater share of registered aircraft in the County. This increasing market share projection yields a selected forecast of 350 based aircraft by the end of the planning period.

Since the process of development of a new airport can typically take from three to ten years to complete, it is difficult to rely on forecasts based upon time. For example, the longer it takes to establish the airport, realization of the demand projections could be delayed. Therefore, the airport demand timeframe will be related to the initial opening of the airport rather than a particular calendar year. A new air-

port is not likely to be open until after 2010. Therefore, the initial planning period will represent the five-year horizon, the intermediate term period will reflect a ten-year horizon, and the long range period will reflect a twenty-year planning horizon. **Exhibit 2C** reflects the based aircraft by planning horizon.

TABLE 2C
Market Share of Registered Aircraft (Pinal County)
New Maricopa Airport

Year	New Maricopa Based Aircraft	Pinal County Registered Aircraft	Market Share of Based Aircraft
2006	54	356	15.2%
Increasing Market Share			
2010	80	500	16.5%
2015	140	790	17.5%
2025	350	1,950	18.0%

Source: Historical Registered Aircraft - Avantex Aircraft & Airmen CD; Forecast Registered Aircraft – Analysis By Coffman Associates.

BASED AIRCRAFT FLEET MIX

Knowing the aircraft fleet mix expected to utilize the airport is necessary to properly plan facilities that will best serve the level of activity and type of activities occurring at the airport. The based aircraft fleet mix at other airports in the vicinity of Maricopa is comprised primarily of single-engine piston aircraft. Multi-engine piston and turbine aircraft comprise less than 10 percent of the totals, with business jet aircraft totaling less than one percent. Nationally, the general aviation fleet mix is around 80 percent single-engine aircraft.

As indicated earlier, none of the public use airports in the area currently have runways longer than 5,200 feet. This limits the current demand for business jet aircraft. Population and employment growth can be expected to generate demand for business jets basing at the new airport. The fleet projections were prepared assuming that the new airport would be developed to attract corporate activity. Any glider or ultralight activity that would be based at the facility would be in addition to the forecasts depicted here.

Table 2D outlines the projected fleet mix. The national trend is towards a larger percentage of sophisticated aircraft and helicopters in the fleet mix. Growth within each category at the airport has been determined by comparison with national projections, which reflect current aircraft in production.

ANNUAL OPERATIONS

Aircraft operations are classified by air traffic control towers as either local or itinerant. A local operation is a take-off or landing performed by an aircraft that operates within sight of the airport, or which executes simulated approaches or touch-and-go operations at the airport. Itinerant op-

erations are those performed by aircraft with a specific origin or destination away from the airport. Generally, local operations are characterized by training operations. Typically, itinerant operations increase with business and industrial use since business aircraft are used primarily to carry people from one location to another.

TABLE 2D
Based Aircraft Fleet Mix
New Maricopa Airport

Year	Total	Single Engine	Multi-Engine	Turbo-prop	Jet	Rotor-craft
Baseline	54	465	5	1	0	2
Percentage Share						
Baseline	100.0%	85.2%	9.3%	1.9%	0.0%	3.7%
FORECAST						
Initial	80	66	7	2	2	3
Intermediate	140	111	10	5	8	6
Long Range	350	270	22	12	30	16
Percentage Share						
Initial	100.0%	82.5%	8.8%	2.5%	2.5%	3.8%
Intermediate	100.0%	79.3%	7.1%	3.6%	5.7%	4.3%
Long Range	100.0%	77.1%	6.3%	3.4%	8.6%	4.6%

Potential operations at a new airport can be estimated based on activity relationships at existing airports. This is done by examining ratios of annual operations per based at towered airports in the area. In the Phoenix area, these ratios were found to fluctuate between 300 and 1,000 operations per based aircraft with the higher ratios at locations with high levels of training activity. For planning purposes, operations at the potential new Maricopa airport were estimated at 600 annual operations per based aircraft. An examination of airports in the area revealed approximately 40 percent of total operations are itinerant. It is estimated that itinerant operations at a new Maricopa airport would initially be 35 percent. As the airport matures with more business-related traffic, the ratio of itinerant operations is expected to gradually increase to 40 percent. **Table 2E** and **Exhibit 2C** present the forecast of annual operations.

TABLE 2E
General Aviation Operations Forecast
New Maricopa Airport

Year	Based Aircraft	Itinerant Ops	Local Ops	Total Ops	Ops Per Based AC
Baseline	54	11,300	21,100	32,400	600
Constant Ratio Projection					
Initial	80	17,000	31,000	48,000	600
Intermediate	140	31,000	53,000	84,000	600
Long Range	350	84,000	144,000	210,000	600

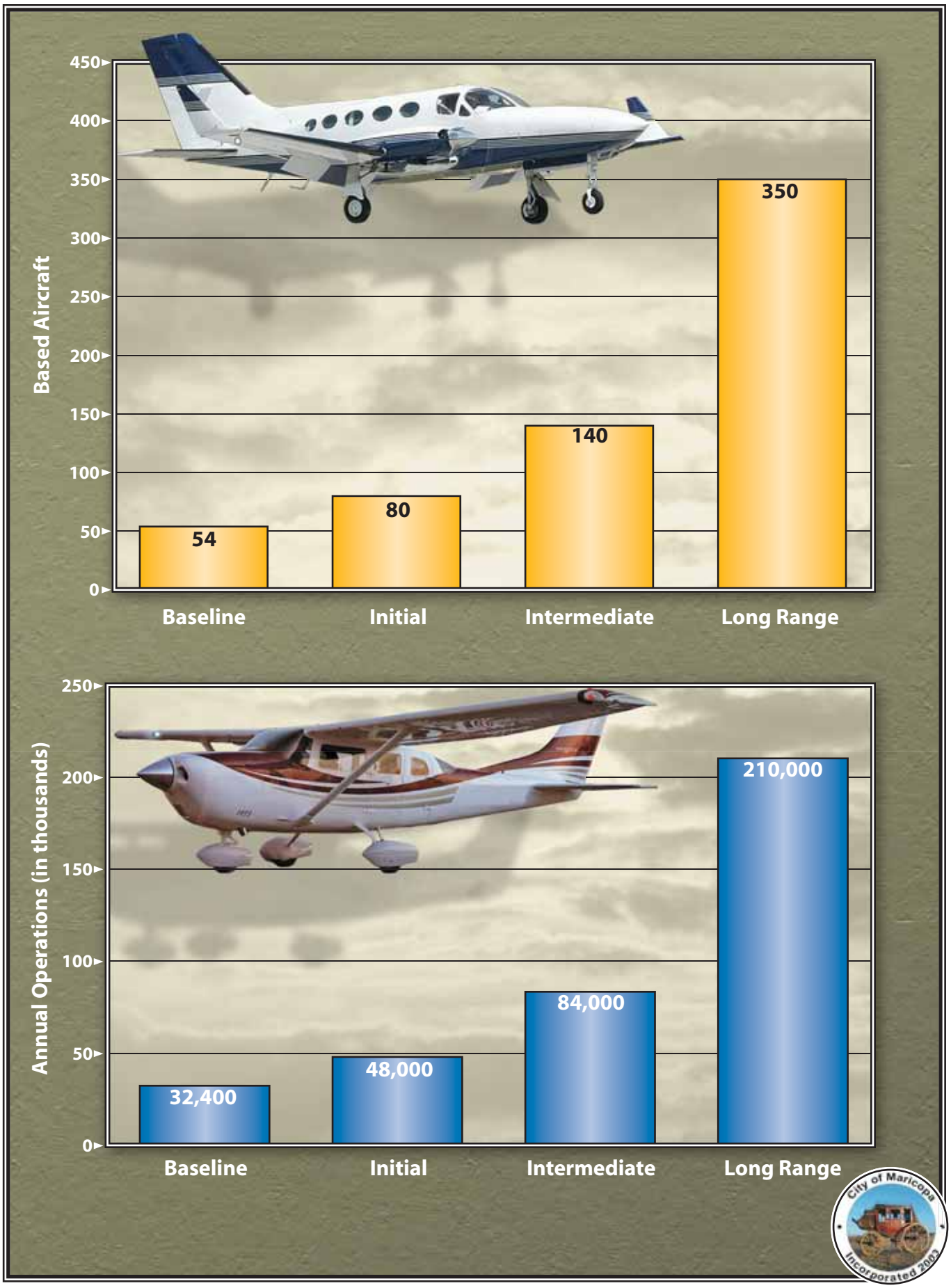

Exhibit 2C
POTENTIAL AIRPORT DEMAND

PEAKING CHARACTERISTICS

Many airport facility needs are related to the levels of activity during peak periods. The periods used in developing facility requirements for this study are as follows:

- **Peak Month** - The calendar month when peak aircraft operations occur.
- **Design Day** - The average day in the peak month. This indicator is easily derived by dividing the peak month operations by the number of days in a month.
- **Busy Day** - The busy day of a typical week in the peak month.
- **Design Hour** - The peak hour within the design day.

It is important to note that only the peak month is an absolute peak within a given year. All other peak periods will be exceeded at various times during the year. However, they do represent reasonable planning standards that can be applied without overbuilding or being too restrictive.

Peak period data from other general aviation airports in the metropolitan area was reviewed to develop estimates for the potential new airport. Typically, the peak month for general aviation operations represents 10-12 percent of the airport's annual operations. For this analysis, 12 percent was used. Design day operations were calculated by dividing the peak month by 31. Daily peak periods are important factors for the provision of adequate aircraft parking apron area on the airport. Typically, busy days account for 1.25 times the design day activity. Design hour operations were estimated at 15 percent of the design day operations, but declining to 12 percent over the planning horizons. **Table 2F** summarizes the general aviation peak activity forecasts. It also includes separate peaks for itinerant general aviation operations.

TABLE 2F
Peaking Period Activity
New Maricopa Airport

	Baseline	Initial	Intermediate	Long Range
Annual Operations	32,400	48,000	84,000	210,000
Peak Month	3,890	5,760	10,080	25,200
Design Day	130	192	336	840
Busy Day	162	240	420	1,050
Design Hour	19	29	54	101
Itinerant Operations	11,300	17,000	31,000	84,000
Peak Month	1,360	2,040	3,720	10,080
Design Day	45	68	124	336
Busy Day	57	85	155	420
Design Hour	7	10	17	40

FACILITY REQUIREMENTS

To properly examine the feasibility of a new airport, it is necessary to translate projected aviation demand into the specific types and quantities of facilities that can adequately serve this expected demand. The objective of this effort is to identify, in general terms, what new facilities may be needed, and when these may be needed to accommodate forecast demands. Having established these facility requirements, general estimates of development costs can be estimated for considering the financial feasibility of the airport facility.

The requirements for new facilities have been expressed for the initial airport as well as the short, intermediate, and long range planning horizons, which roughly correlate to five-year, ten-year, and twenty-year time frames.

AIRFIELD DESIGN STANDARDS

The selection of appropriate Federal Aviation Administration (FAA) design standards for the development and location of airport facilities is based primarily upon the characteristics of the aircraft which are currently using or are expected to use the airport. Planning for future aircraft use is of particular importance since design standards are used to plan separation distances between facilities. These standards must be determined now, since the relocation of these facilities will likely be extremely expensive at a later date.

The FAA has established a coding system to relate airport design criteria to the operational and physical characteristics of aircraft expected to use the airport. This code, the airport reference code (ARC), has two components. The first component, depicted by a letter, is the aircraft approach speed (operational characteristic); the second component, depicted by a Roman numeral, is the airplane design group and relates to aircraft wingspan (physical characteristic). Generally, aircraft approach speed applies to runways and runway-related facilities, while aircraft wingspan primarily relates to separation criteria involving taxiways, taxilanes, and landside facilities.

According to FAA Advisory Circular (AC) 150/5300-13, *Airport Design*, an aircraft's approach category is based upon 1.3 times its stall speed in landing configuration at that aircraft's maximum certificated weight. The five approach categories used in airport planning are as follows:

Category A: Speed less than 91 knots.

Category B: Speed 91 knots or more, but less than 121 knots.

Category C: Speed 121 knots or more, but less than 141 knots.

Category D: Speed 141 knots or more, but less than 166 knots.

Category E: Speed greater than 166 knots.

The airplane design group (ADG) is based upon the aircraft's wingspan and tail height. The six ADGs used in airport planning are as follows:

Group I: Up to but not including 49 feet wingspan or tail height up to but not including 20 feet.

Group II: 49 feet up to but not including 79 feet wingspan or tail height from 20 up to but not including 30 feet.

Group III: 79 feet up to but not including 118 feet wingspan or tail height from 30 up to but not including 45 feet.

Group IV: 118 feet up to but not including 171 feet wingspan or tail height from 45 up to but not including 60 feet.

Group V: 171 feet up to but not including 214 feet wingspan or tail height from 60 up to but not including 66 feet.

Group VI: 214 feet up to but not including 262 feet wingspan or tail height from 66 up to but not including 80 feet.

In order to determine facility requirements, an ARC should first be determined, and then appropriate airport design criteria can be applied. This begins with a review of the type of aircraft using and expected to the airport. **Exhibit 2D** provides a listing of typical aircraft and their associated ARC.

The FAA recommends designing airport functional elements to meet the requirements of the most demanding ARC for that airport (minimum of 500 annual operations). In order to determine the airport's facility requirements, the ARC of the critical aircraft should first be determined. The most demanding aircraft at the proposed airport will be corporate aircraft comprised of business jets and turboprops. Initially, the airport should be capable of at least accommodating aircraft in ARC C-II. This will provide a facility designed to handle the majority of business jets. For the long term, a new Maricopa airport should ultimately be capable of accommodating a full range of business jets up to ARC D-III. This would include aircraft such as the Gulfstream V and the Global Express.

AIRFIELD REQUIREMENTS

Airfield requirements include the need for those facilities related to the arrival and departure of aircraft. These facilities are comprised of the following items:

- Runways
- Taxiways
- Navigational Aids
- Airfield Marking and Lighting

A single runway should be capable of handling the initial activity at the proposed airport, unless it is to be colocated with recreational aviation facilities. In that case, a parallel dirt runway should be included to accommodate the gliders, tail draggers, and other slow-moving recreational aircraft.

07SP04-2D-7/19/07

A-I

- Beech Baron 55
- Beech Bonanza
- Cessna 150
- Cessna 172
- Cessna Citation Mustang
- **Eclipse 500**
- Piper Archer
- Piper Seneca

B-I *less than 12,500 lbs.*

- Beech Baron 58
- Beech King Air 100
- Cessna 402
- **Cessna 421**
- Piper Navajo
- Piper Cheyenne
- Swearingen Metroliner
- Cessna Citation I

B-II *less than 12,500 lbs.*

- **Super King Air 200**
- Cessna 441
- DHC Twin Otter

B-I, B-II *over 12,500 lbs*

- Super King Air 300
- Beech 1900
- Jetstream 31
- Falcon 10, 20, 50
- Falcon 200, 900
- **Citation II**, III, IV, V
- Saab 340
- Embraer 120

A-III, B-III

- DHC Dash 7
- **DHC Dash 8**
- DC-3
- Convair 580
- Fairchild F-27
- ATR 72
- ATP

C-I, D-I

- Beech 400
- **Lear** 25, 31, **35**, 45, 55, 60
- Israeli Westwind
- HS 125-400, 700

C-II, D-II

- Cessna Citation III, VI, VIII, X
- **Gulfstream** II, III, **IV**
- Canadair 600
- ERJ-135, 140, 145
- CRJ-200, 700, 900
- Embraer Regional Jet
- Lockheed JetStar
- Super King Air 350

C-III, D-III

- ERJ-170, 190
- Boeing Business Jet
- B 727-200
- **B 737-300 Series**
- MD-80, DC-9
- Fokker 70, 100
- A319, A320
- Gulfstream V
- Global Express

C-IV, D-IV

- **B-757**
- B-767
- C-130
- DC-8-70
- DC-10
- MD-11
- L1011

D-V

- **B-747** Series
- B-777

Note: Aircraft pictured is identified in bold type.

Exhibit 2D
AIRPORT REFERENCE CODES

In the long range, the forecast traffic will warrant the development of a parallel runway. The separation between the centerlines of the two paved runways should be at least 700 feet. The parallel runway should be of sufficient design to accommodate on the order of 90 percent of the aircraft types using the airport. As a result, it should ultimately be planned to ARC B-II.

Based upon wind analysis from Casa Grande and other airports in the metropolitan area, a single runway orientation should achieve significantly higher than 95 percent wind coverage for all types of aircraft. Thus, a crosswind runway should not be required.

Runway length requirements specific to conditions in Maricopa for the various classifications of general aviation aircraft that may operate at the airport were examined using the FAA Airport Design Computer Software, Version 4.2D. The program groups general aviation aircraft into several categories, reflecting the percentage of the fleet within each category. **Table 2G** summarizes FAA's generalized recommended runway lengths for a new Maricopa airport.

TABLE 2G
Runway Length Requirements
New Maricopa Airport

AIRPORT AND RUNWAY DATA	
Airport elevation	1,190 feet
Mean daily maximum temperature of the hottest month	107.0° F
Maximum difference in runway centerline elevation	25 feet
Length of haul for airplanes of more than 60,000 pounds	2,000 miles
RUNWAY LENGTHS RECOMMENDED FOR AIRPORT DESIGN	
Small airplanes with less than 10 passenger seats	
75 percent of these small airplanes	3,100 feet
95 percent of these small airplanes	3,700 feet
100 percent of these small airplanes	4,400 feet
Small airplanes with 10 or more passengers seats	4,800 feet
Large airplanes of 60,000 pounds or less	
75 percent of large airplanes at 60 percent useful load	5,500 feet
75 percent of large airplanes at 90 percent useful load	8,500 feet
100 percent of large airplanes at 60 percent useful load	7,300 feet
100 percent of large airplanes at 90 percent useful load	11,300 feet
Airplanes of more than 60,000 pounds	8,300 feet

Reference: FAA's Airport Design Computer Software, Version 4.2D.

The table also outlines the runway length requirements for the business jet aircraft weighing 60,000 pounds or less. A runway length of 5,500 feet would be needed to adequately accommodate 75 percent of the business jet fleet at a useful load of 60 percent. This should be adequate for the initial

development of the airport. To accommodate a full range of business jet activity at 60 percent useful load, however, a runway length of 7,300 feet will be needed. This may need to be considered by the intermediate planning horizon.

Growing use of aircraft such as the Gulfstream IV and V and the Global Express could eventually make the larger-than-60,000 pound aircraft the most demanding family of aircraft. The table indicates that these aircraft could operate on at least a 2,000-mile trip length (equivalent of Phoenix to Boston) with a runway length of 8,300 feet. Based upon the future critical aircraft and the desired haul lengths, the primary runway length at the new airport should ultimately be planned to 8,300 feet. The ultimate parallel runway should be constructed at a length of 4,400 feet, which will accommodate 100 percent of small airplanes.

Additional airfield requirements are summarized on **Table 2H**. These include a full length parallel taxiway for both paved runways, as well as the construction of a dirt runway. A summary of the required navigational aids, lighting, and marking are also presented in the table.

TERMINAL AREA REQUIREMENTS

Terminal area facilities are those necessary for handling of aircraft, passengers, and cargo while on the ground. These facilities provide the essential interface between air and ground transportation modes. The capacities of the various components of each area were examined in relation to projected demand to identify future landside facility needs during the planning period for the following types of facilities normally associated with general aviation terminal areas:

- Hangars
- Aircraft Parking Apron
- General Aviation Terminal
- Access and Vehicle Parking

Hangars

The demand for hangar facilities typically depends on the number and type of aircraft expected to be based at the airport. Hangar facilities are generally classified as shade hangars, T-hangars, or conventional hangars. Conventional hangars can include individual hangars or multi-aircraft hangars. These different types of hangars offer varying levels of privacy, security, and protection from the elements.

Typical utilization of hangar space varies across the country as a function of local climate conditions, airport security, and owner preferences. The intense summer weather conditions in Phoenix places a premium on sheltered parking. Weather is not the only factor that influences the demand for hangar storage. The larger, more sophisticated, and more expensive aircraft tend to be stored in hangars. Owners of these types of aircraft normally desire hangar space to protect their investment. The cost and availability of hangar storage does affect

the percentage of aircraft stored in hangars. For planning purposes, it was estimated that 75 percent of piston aircraft would initially be hangared, with that percentage gradually increasing to 85 percent over the planning period.

TABLE 2H
Airfield Facility Requirements
New Maricopa Airport

	Initial	Intermediate	Long Range
Airport Reference Code	C-II	D-II	D-III
Primary Runway Length (ft.) Width (ft.) Strength (lbs.)	 5,500 100 30,000 SWL	 7,300 100 30,000 SWL	 8,300 100 75,000 DWL
Secondary Runway ARC Length (ft.) Width (ft.)	NA NA NA	NA NA NA	B-II 4,400 75
Dirt Runway (if required) Length (ft.) Width (ft.)	A-I 3,700 120	A-I 3,700 120	A-I 4,400 120
Taxiway Width (ft.)	Parallel 35	Parallel 35	Parallel 50
Navigational Aids	PAPI-4 GPS	PAPI-4 GPS	PAPI-4 GPS ATCT
Lighting	MIRL REILs Beacon	MIRL REILs Beacon	MALSR MIRL REILs Beacon
Marking	Nonprecision Segmented Circle Wind Cone	Nonprecision Segmented Circle Wind Cone	Precision Segmented Circle Wind Cone

Approximately 73 percent of hangared aircraft at a new Maricopa airport would initially be stored in T-hangars, with this percentage declining throughout the planning period. A planning standard of 1,200 square feet per based aircraft has been used to determine future T-hangar requirements.

The remaining 27 percent of hangared aircraft would be stored in executive/conventional hangars, with this percentage increasing throughout the planning period. These types of hangars are designed for multiple aircraft storage. As the trend towards more sophisticated aircraft continues throughout the planning period, it is

important to determine the need for more executive/conventional hangars. A planning standard of 1,200 square feet was used for single engine aircraft, while a planning standard of 3,000 square feet was used for multi-engine aircraft, jets, and helicopters.

Since portions of conventional hangars are also used for aircraft maintenance and servicing, requirements for maintenance/service hangar area were estimated using a planning standard of approximately 15 percent of the total hangar space needs. Future hangar requirements for a new Maricopa airport are summarized in **Table 2J**.

TABLE 2J
Terminal Area Requirements
New Maricopa Airport

	Initial	Intermediate	Long Term
Based Aircraft	80	140	350
Annual Operations	48,000	84,000	210,000
Aircraft to be Hangared			
Piston	62	103	248
Turbine	4	13	42
Helicopter	3	6	16
Total	69	122	306
Hangar Positions			
Shade or T-Hangars	56	93	223
Conventional Hangars	13	29	83
Hangar Storage Area (s.f.)			
Shade or T-Hangars	67,200	111,600	267,600
Conventional Hangars	22,400	57,400	171,800
Maintenance Hangar Area (s.f.)	14,000	24,500	61,250
Aircraft Parking			
Positions			
Local Tiedowns	11	18	44
Apron Area (s.y.)	3,900	6,300	15,400
Transient Ramp			
Positions	21	39	105
Apron Area (s.y.)	14,300	27,200	74,300
Terminal Building (s.f.)	2,000	3,700	10,200
Auto Parking			
Spaces	68	124	326
Area (s.f.)	23,800	43,400	114,100

Aircraft Parking Apron

A parking apron should provide for the number of locally based aircraft that are not stored in hangars, as well as transient aircraft. For planning purposes, 15 percent of the based piston aircraft total was used to estimate the apron tie-down requirements for based aircraft. A planning criterion of 350 square yards per aircraft was used to

determine the apron requirements for local aircraft.

FAA Advisory Circular 150/5300-13 suggests a methodology by which transient apron requirements can be estimated from busy day operations. The number of transient spaces necessary was estimated to be approximately 25 percent of the busy day itinerant operations. Planning criterion of 600 square yards was used per transient for piston aircraft and 1,000 square yards for transient turbine and rotorcraft. Total aircraft parking apron requirements are presented in **Table 2J**.

General Aviation Terminal

A general aviation terminal can serve several functions including providing space for passenger waiting, pilot's lounge and flight planning, concessions, line service and airport management offices, storage, and various other needs. At most general aviation airports, these functions may not necessarily be limited to a single, separate terminal building, but can also be included in the space offered by fixed base operators for these functions and services. For purposes of this analysis, the space requirements will reflect that of a single, public terminal building. Space provided by airport operators, while decreasing the space requirements of a public terminal, will generally increase the overall square footage requirements because of some duplication of function.

The methodology used in estimating general aviation terminal facility needs was based on the number of itinerant passengers expected to utilize terminal facilities during the design hour and FAA guidelines. A planning average of 2.2 passengers per itinerant flight increasing to 2.8 passengers per itinerant flight by the end of the planning period was multiplied by the number of design hour itinerant operations to determine design hour itinerant passengers. Space requirements were then based upon providing 90 square feet per design hour itinerant passenger. **Table 2J** outlines the general space requirements for a general aviation terminal.

Vehicle Access and Parking

Using trip generation estimates from the *Institute of Transportation Engineers (ITE) Trip Generation Manual, 5th Edition*, the airport is estimated to generate 2.6 daily vehicle trips per aircraft operation. Based upon this ratio, design day trips can be expected to grow from 400 initially to 1,800 over the long range. This traffic level is not significant enough to require additional roadway capacity; however, the development of an adjacent business park could increase traffic to ultimately justify four-lane access in the vicinity of the airport.

Vehicle parking requirements were determined based on industry standards. General aviation spaces were calculated by multiplying design hour itinerant passengers by an industry standard of 1.8. Parking for based aircraft owners was estimated at 35 percent of the total based aircraft.

Auto parking requirements are also summarized in **Table 2J**.

PROTOTYPE AIRPORT

When planning a new airport, or improvements to an existing airport, the appropriate Federal Aviation Administration (FAA) design standards based on the airport reference code (ARC) should be employed. For an airport intended to serve a wide variety of activities from gliders to large business jets, it is advisable to apply design standards to those areas of the airport where each aircraft type is planned to operate. For example, the ultimate primary runway should be designed to accommodate large business jets up to ARC D-III. A potential future parallel runway need only be designed to accommodate up to ARC B-II. Due to the potential for co-location with the glider activity in the area, this airport may also need to provide an unpaved landing area.

Exhibit 2E presents a prototype airport for the City of Maricopa. The primary runway would be initially constructed to a length of 5,500 feet and a width of 100 feet. A parallel taxiway is planned at a separation distance from the runway, centerline to centerline, of 400 feet. This 400-foot separation is the standard for Group III wingspans. It is also the standard for any airport providing a Category I (CAT-I) approach with visibility minimums down to one-half mile and cloud ceiling heights down to 200 feet.

The runway protection zones (RPZ) are trapezoidal areas located off the ends of each runway that are to be clear of incompatible objects and activities. The dimensions of the RPZ are a function of the type of aircraft using the runway and the approach visibility minimums associated with each runway end.

The runway end serving the prevailing aircraft flow direction is ultimately planned for a CAT-I approach. The RPZ on this runway end is 2,500 feet long, with a 1,000-foot inner width and a 1,750-foot outer width. The opposite runway end is planned for an approach with not lower than one mile visibility minimums. The RPZ on this runway end is 1,700 feet long, with a 500-foot inner width and a 1,010-foot outer width.

The parallel taxiway centerline to aircraft parking areas (the beginning of apron area) should be a minimum of 100 feet, which is depicted on the exhibit. A central aircraft parking apron is planned to a width of 400 feet and a length of 2,000 feet (approximately 90,000 square yards). Several large conventional hangars measuring up to 150 feet by 200 feet along the apron are intended to be occupied by fixed base operators (FBO) and multi-hangar storage. These large hangars are set to either side of an airport terminal building.

Strategies for locating landside facilities such as hangars follow a philosophy of separating activity levels. High activity areas such as FBO facilities

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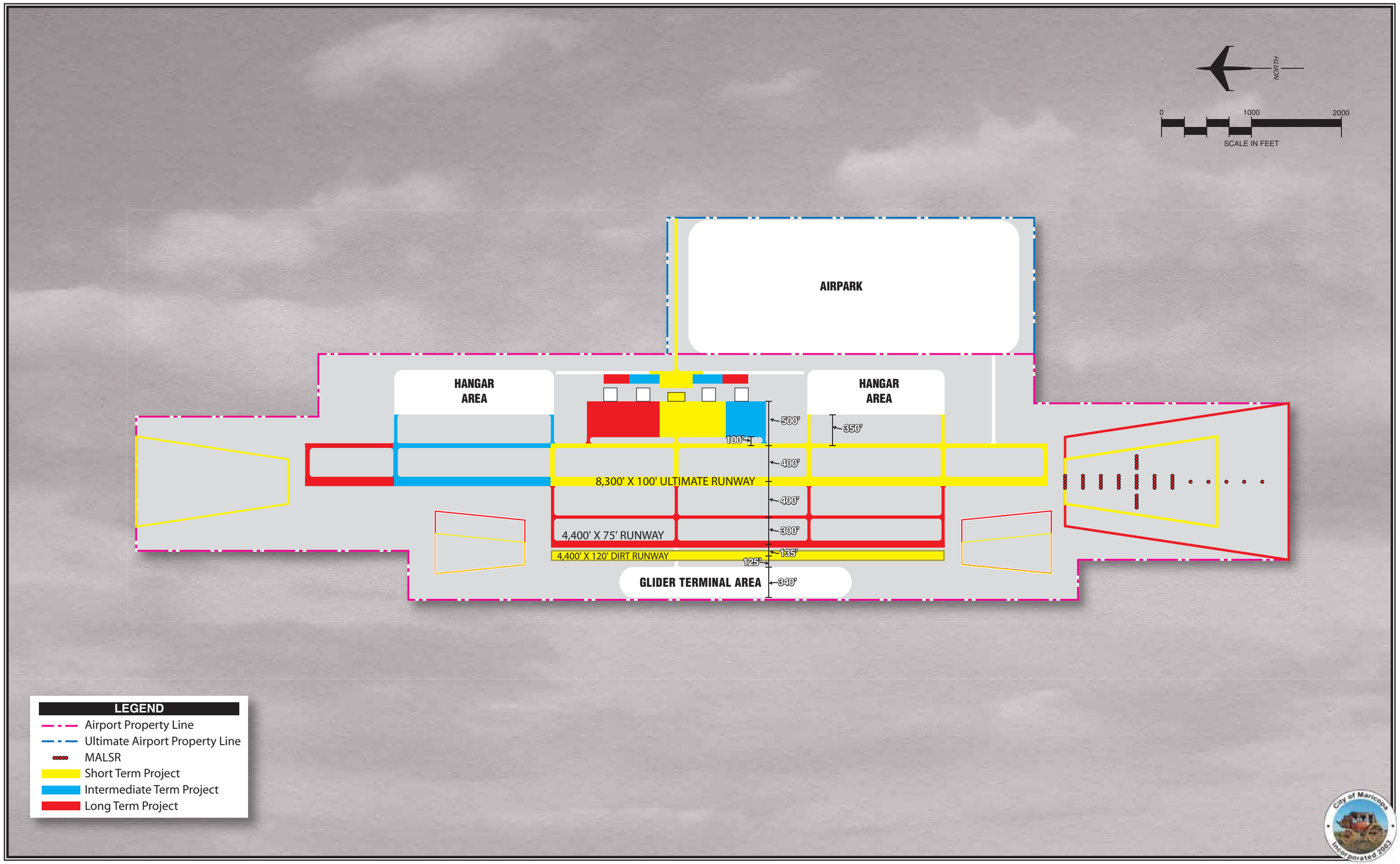

Exhibit 2E
PROTOTYPE AIRPORT LAYOUT

and the terminal building should be located central to the runway system. This allows for maximum efficiency of movement and limited taxi times. Medium activity levels would include corporate aviation departments or other airport aviation businesses. These users will typically occupy a medium-sized hangar. These structures should be located to the sides of the high activity level areas and have direct access to the runway system. Low activity levels would include individual aircraft owner hangars such as a T-hangar. These facilities should be located further to the sides of the medium and high activity areas or perhaps set back from the flight line.

The location of any of these facilities needs to consider FAA airspace restrictions. The transition surface is one of several imaginary surfaces that surround the runway. This surface rises at a 7:1 ratio beginning 500 feet from the runway centerline and should not be penetrated by structures. Therefore, larger conventional hangars are planned to begin no closer than 800 feet from the runway centerline and smaller T-hangars 750 feet from the runway centerline.

Those areas parallel to the runway, or the flightline, should be reserved for aviation uses. At the very least, all land out to a distance of 500 feet should be owned by the airport if no facilities are planned. An additional 900 feet should be planned if aviation-related facilities are planned. Therefore, it is advisable for the airport to own at least 1,400 feet of property from the runway centerline. Any additional land outside this initial 1,400-foot buffer can be planned for either aviation or non-aviation uses.

The history of aviation activity in the Phoenix metropolitan area has shown that facilities grow rather quickly in terms of activity and capacity becomes an issue. The prototype airport anticipates the need for a parallel runway to primarily accommodate local training activity. As mentioned, a parallel runway can be designed to accommodate smaller aircraft. The parallel runway is planned to a length of 4,400 feet and a width of 75 feet. ARC B-II design standards are applied for the various FAA design standards.

The RPZs serving this runway will be much smaller as there will not be a need for the sophisticated CAT-I type approach. The RPZs serving this runway will be 1,000 feet long, 500 feet wide on the inner width and 700 feet on the outer width. These RPZs can provide for instrument approaches with visibility minimums not lower than one mile.

The parallel runway should be located no closer than 700 feet from the primary runway, centerline to centerline. This distance will allow for simultaneous visual approaches to both runways.

There may be a need to support glider activity at the planned airport. For this purpose, a graded dirt landing strip is located parallel to the training runway. The dirt runway is planned to the same length as the training runway (4,400 feet) and is 120 feet wide. The dirt runway is 135 feet, centerline to centerline, from the

training runway. This distance allows for the runway safety area (RSA) surrounding the training runway to be clear. From the centerline of the dirt runway to the glider terminal area should be at least 125 feet. An additional 340 feet should also be under airport ownership to allow for any future development on this side of the airport.

The total area of this prototype airport is approximately 650 acres. This is the minimum that the City of Maricopa should consider when acquiring property for airport use. Only those portions of the property necessary for the basic airport and support facilities would need to be developed at the outset.

FEASIBILITY ANALYSIS

The analysis conducted thus far in this study has been to determine the potential market for a general aviation airport to primarily serve the Maricopa and western Pinal County. This airport may also serve some of the aviation needs of the Goodyear area in southern Maricopa County. The basic facilities required for such an airport have been established and a prototype airport identified. This section will examine the development costs of a general aviation facility, the potential funding for those costs, preliminary revenue and operating cost forecasts, and the potential economic benefits to the community.

DEVELOPMENT COST ESTIMATES

Three stages have been selected to illustrate the basic capital project costs associated with developing a new airport. The initial phase includes those airport elements necessary to support a basic general aviation airport capable of serving 75 percent of the general aviation fleet at 60 percent useful load. This standard includes all single and multi-engine aircraft as well as a majority of business jets in the national fleet. The remaining business jets could still operate at the airport, but would likely be weight-restricted. Ultimately, the runway is planned to be extended from 5,500 feet to 8,300 feet. This length would accommodate the full range of business jets on a regular basis.

Initial Construction

Once a site is selected for the new airport, appropriate master planning and environmental documentation will be necessary. To be eligible for federal and state funding, the airport will require an airport layout plan (ALP) approved by the FAA. As part of this approval process, FAA will require environmental approval. Typically, this will include an Environmental Assessment (EA) which adheres to the standards set forth in the *National Environmental Policy Act* (NEPA). Once the site has been assessed from an environmental impact perspective, and the ALP approved, the airport property can be acquired. It is estimated that the ultimate airport would encompass approximately 650 acres.

Acquisition of this entire tract is considered in the short term planning horizon. Experience has shown that waiting to purchase land necessary for future development can often lead to land being unavailable, developed, or much more expensive. This entire tract should be fenced with six-to eight-foot high chain-link fence with barbed wire on top.

It is anticipated that the site selected will not require extensive earthwork to accommodate the airport. Therefore, an estimate for site preparation costs assumes a basic grading program with minimal fill and removal of soil. Nonetheless, site preparation for an initial 300-acre development tract is estimated at $8.7 million dollars.

The airport will require the extension of utilities. As a placeholder, utility extension to the airport is estimated at 1,000 feet plus the width of the runway. Depending on the site selected, this figure could go up or down. The access road to the airport also assumes a 1,000-foot runway at a 40-foot width.

In the short term, the runway is planned to a length of 5,500 feet and a width of 100 feet. A parallel taxiway is planned which would be 35 feet wide. This initial runway would provide five entrance and exit taxiways. Taxilanes would be provided to the hangar development area. These taxilanes would be 35 feet wide and have a strength rating for 12,500 pounds. The taxilanes do not need to be constructed to the same standard as the parallel taxiway, which would be wider and stronger.

Both the runway and taxiways would be outfitted with edge lighting. Edge lighting is important to define the lateral extent available for aircraft movements. The runway would need runway end identification lights (REILs). These strobe lights are set to the side of the runway ends and help pilots positively locate the runway ends during day and night operations. Precision approach path indicators (PAPIs) lights provide a visual indication to pilots of the appropriate approach slope to the runway touchdown point. These visual aids are provided on both ends of the runway.

Weather aids planned for the airport include an automated weather observation system (AWOS). Pilots are able to obtain airport-specific weather conditions, such as wind speed and direction, from the AWOS. Three lighted wind cones provide wind speed and directional information and a segmented circle is planned to provide traffic pattern information.

The initial airport construction is planned to include a centrally located aircraft parking apron. This first phase of the apron is planned to encompass 18,000 square yards of pavement. A 2,000-square-foot terminal building is also planned initially. This facility should include space for a pilot briefing room, weather monitoring equipment, lounge, and manager's office. An initial automobile parking lot of 24,000 square feet is planned.

It is estimated that the total initial investment necessary for the new airport is $44.6 million dollars. **Table 2K** presents the cost estimates for the

airport development. Also included is a breakdown of what portions of the projects would be eligible for either Federal FAA and/or State of Arizona funding. A description of these funding mechanisms is presented in the section to follow.

TABLE 2K
Potential Airport Development Costs
New Maricopa Airport

	Total	FAA Eligible	ADOT Eligible	Local Share
Initial Construction				
Environmental/Planning Documentation	$800,000	$760,000	$20,000	$20,000
Property Acquisition (650 acres)	$21,450,000	$20,377,500	$536,250	$536,250
Site Preparation (300 acres)	$9,801,000	$9,310,950	$245,025	$245,025
Airport Utilities	$1,755,000	$1,667,250	$43,875	$43,875
Primary Runway (5,500' x 100')	$4,125,000	$3,918,750	$103,125	$103,125
Taxiway Paving (parallel and 5 entrances)	$2,813,000	$2,672,350	$70,325	$70,325
Taxilanes to Hangars (2)	$110,000	$104,500	$2,750	$2,750
Aircraft Apron	$1,215,000	$1,154,250	$30,375	$30,375
Dirt Runway Construction	$238,000	$226,100	$5,950	$5,950
Airfield Lighting and Marking	$614,000	$583,300	$15,350	$15,350
REILs	$68,000	$64,600	$1,700	$1,700
PAPIs	$108,000	$102,600	$2,700	$2,700
Fencing	$740,000	$703,000	$18,500	$18,500
Airport Access Roads	$180,000	$171,000	$4,500	$4,500
Auto Parking	$89,000	$0	$80,100	$8,900
Terminal Building	$270,000	$0	$243,000	$27,000
Weather Aids	$203,000	$192,850	$5,075	$5,075
Initial Construction Totals	**$44,579,000**	**$42,009,000**	**$1,428,600**	**$1,141,400**
Intermediate Term Construction				
Environmental/Planning Documentation	$500,000	$475,000	$12,500	$12,500
Site Preparation (100 acres)	$3,267,000	$3,103,650	$81,675	$81,675
Primary Runway Extension (1,800' x 100')	$1,350,000	$1,282,500	$33,750	$33,750
Taxiway Extension (parallel and entrance)	$825,000	$783,750	$20,625	$20,625
Airfield Lighting and Marking	$208,000	$197,600	$5,200	$5,200
Taxilanes to Hangars (2)	$110,000	$104,500	$2,750	$2,750
Aircraft Apron	$790,000	$750,500	$19,750	$19,750
Auto Parking	$74,000	$0	$66,600	$7,400
Terminal Building Expansion	$270,000	$0	$243,000	$27,000
Intermediate Construction Costs	**$7,394,000**	**$6,697,500**	**$485,850**	**$210,650**
Long Term Construction				
Environmental/Planning Documentation	$500,000	$475,000	$12,500	$12,500
Site Preparation (150 acres)	$4,901,000	$4,655,950	$122,525	$122,525
Primary Runway Extension (1,000' x 100')	$750,000	$712,500	$18,750	$18,750
Taxiway Extension (parallel and entrance)	$525,000	$498,750	$13,125	$13,125
Parallel Runway (4,400' x 75')	$1,485,000	$1,410,750	$37,125	$37,125
Parallel Taxiway (35' wide)	$1,134,000	$1,077,300	$28,350	$28,350
Parallel Lighting and Marking	$477,000	$453,150	$11,925	$11,925
REILs	$68,000	$64,600	$1,700	$1,700
PAPIs	$108,000	$102,600	$2,700	$2,700
MALSR	$1,215,000	$1,154,250	$30,375	$30,375
Aircraft Apron	$3,814,000	$3,623,300	$95,350	$95,350
Auto Parking	$265,000	$0	$238,500	$26,500
Terminal Building Expansion	$837,000	$0	$753,300	$83,700
Airport Traffic Control Tower	$4,050,000	$3,847,500	$101,250	$101,250
Long Term Construction Costs	**$20,129,000**	**$18,075,650**	**$1,467,475**	**$585,875**
Total Development Costs	**$72,102,000**	**$66,782,150**	**$3,381,925**	**$1,937,925**

Intermediate Term Projects

All intermediate term projects should be based on demand. The airport sponsor should not consider these projects unless the demand indicators, such as based aircraft and operations, are being reached. Assuming that the demand indicators are being met, several intermediate term projects will require further environmental and planning study.

Approximately 100 acres of airport property that was not previously prepared will now need to be graded to allow for development. The primary runway is planned for a 1,800-foot extension, which would bring the total length to 7,300 feet. The parallel taxiway would then be extended to the runway ends as well. Taxiway and runway lighting would be continued. Two taxilanes to a new hangar development area are also planned in this timeframe.

The main aircraft apron is planned to be expanded by approximately 15,000 square yards. The terminal building would be doubled in size. Automobile parking serving the terminal area is also expanded. Intermediate term construction costs are estimated at $7.4 million.

Long Term Projects

Continued airport development will require further environmental and planning study. A placeholder of $500,000 has been added to address these needs in the long term.

Assuming that demand indicators are continuing to be met, the airport would be in need of a parallel runway in order to add airfield capacity and allow for continued growth. The remaining 150 acres of airport property is planned for site preparation. A portion of this area would be planned for the parallel runway.

The parallel runway would be intended to accommodate primarily local training operations. This runway is planned to a length of 4,400 feet and a width of 75 feet. These dimensions will accommodate all smaller piston-powered general aviation aircraft. Appropriate edge lighting for the runway and taxiway is also necessary. This runway would be outfitted with REILs and PAPIs.

The primary runway is planned for a 1,000-foot extension, bringing the total runway length up to 8,300 feet. Taxiway extension and lighting is also planned. The opposite end of the primary runway is then planned for the installation of a sophisticated approach lighting system. This medium intensity approach lighting system with runway alignment indicator lights (MALSR) will allow the airport to remain open into periods of poor visibility conditions. It is assumed that the MALSR will be utilized in conjunction with the global positioning system (GPS) to provide the necessary approach visibility minimums.

The last project of the long term planning period is the construction of an airport traffic control tower (ATCT).

The terminal as well as automobile and aircraft apron areas are also expanded as demand warrants in the long term. Long term projects are estimated to total $20.1 million.

POTENTIAL FUNDING SOURCES

Construction of a general aviation airport in the vicinity of the City of Maricopa will not rely exclusively upon the airport sponsor for funding. Capital funding is available through various grant-in-aid programs on both the state and federal levels. The following discussion outlines key sources of funding potentially available for the development of a new airport. **Table 2K** presents the project costs as well as a breakdown of what portions of those costs are eligible for grant funding.

Federal Grants

Through federal legislation over the years, various grant-in-aid programs have been established to develop and maintain a system of public airports across the United States. The purpose of this system and its federally based funding is to maintain national defense and to promote interstate commerce. The most recent legislation affecting federal funding was enacted in late 2003 and is entitled, *Century of Aviation Reauthorization Act,* or *Vision 100.*

The four-year bill covers FAA fiscal years 2004, 2005, 2006, and 2007. This bill presented similar funding levels to the previous bill - *Air 21.* Airport Improvement Program (AIP) funding was authorized at $3.4 billion in 2004, $3.5 billion in 2005, $3.6 billion in 2006, and $3.7 billion in 2007. The current bill provides the FAA and local airport sponsors the opportunity to plan for longer term projects versus simple one-year reauthorizations.

The source for *Vision 100* funds is the Aviation Trust Fund. The Aviation Trust Fund was established in 1970 to provide funding for aviation capital investment programs (aviation development, facilities and equipment, and research and development). The Aviation Trust Fund also finances the operation of the FAA. It is funded by user fees, taxes on airline tickets, aviation fuel, and various aircraft parts.

Funds are distributed each year by the FAA from appropriations by Congress. A portion of the annual distribution is to primary commercial service airports based upon enplanement levels. If Congress appropriates the full amounts authorized by *Vision 100*, eligible general aviation airports could receive up to $150,000 of additional funding each year in Non-Primary Entitlement (NPE) funds (*National Plan of Integrated Airport Systems* [NPIAS] inclusion is required for general aviation entitlement funding).

The remaining AIP funds are distributed by the FAA based upon the priority of the project for which they have requested federal assistance through discretionary apportionments. A National Priority Ranking System is used to evaluate and rank each airport project. The airport sponsor would have

to compete with all airports nationally for FAA discretionary funding.

Therefore, discretionary funds are not assured. If the necessary funding for the development of a new airport is not forthcoming in the form of AIP grants, then projects would either be delayed or require funding from other sources. One other federal source would be a direct Congressional allocation, or earmark.

Both the four-year aviation financing bill and the Aviation Trust Fund, from which the FAA allots grant monies, are up for reauthorization by the end of fiscal 2007. As of August 2007, neither program has been reauthorized. Without legislative authorization in place, funding availability can be jeopardized.

In Arizona, general aviation airport development projects that met FAA's eligibility requirements can receive 95 percent funding. Property acquisition, navigational aids, airfield pavement, and access roads, are examples of eligible airport development elements. General aviation terminal buildings, hangars, and other revenue-producing elements are not eligible for federal grant assistance. Under rare circumstances, some hangars and fuel farm facilities may be eligible.

The Airway Facilities Division of the FAA administers the national Facilities and Equipment (F&E) Program. This annual program provides funding for the installation and maintenance of various navigational aids and equipment for the national airspace system and airports. Under the F&E program, funding is provided for FAA air traffic control towers, enroute navigational aids such as the VORs, and on-airport navigational aids such as PAPIs and approach lighting systems.

As activity levels and other development warrant, the airport may be considered by the FAA for installation and maintenance of navigational aids. Navigational aids such as the MALSR, PAPIs, and REILs may be eligible for funding through this division of the FAA. Should the FAA install these navigational aids, they would operate and maintain them at no cost to the airport. It should be noted that this division of the FAA is currently primarily focused on maintaining existing navigational aids and has limited funding for new equipment. Today, most airports in need of these navigational aids will not rely on F&E.

State Funding

In support of the state aviation system, the State of Arizona also participates in airport improvement projects. The source for state airport improvement funds is the Arizona Aviation Fund. Taxes levied by the state on aviation fuel, flight property, aircraft registration tax, and registration fees (as well as interest on these funds) are deposited in the Arizona Aviation Fund.

Under the State of Arizona's grant program, an airport can receive funding for one-half (currently 2.5 percent) of the local share of projects receiving federal AIP funding. The state also provides 90 percent funding for pro-

jects which are typically not eligible for federal AIP funding or have not received federal funding.

State Airport Loan Program

The Arizona Department of Transportation (ADOT) - Aeronautics Division's Airport Loan Program was established to enhance the utilization of state funds and provide a flexible funding mechanism to assist airports in funding improvement projects. Eligible projects include runway, taxiway, and apron improvements; land acquisition; planning studies; and the preparation of plans and specifications for airport construction projects. Unlike the federal AIP funding mechanism, revenue-generating improvements, such as hangars and fuel storage facilities, are eligible under the State Airport Loan Program. Projects which are not currently eligible for the State Airport Loan Program are considered if the project would enhance the airport's ability to be financially self-sufficient.

There are three ways in which the loan funds can be used: Grant Advance, Matching Funds, or Revenue-Generating Projects. The Grant Advance loan funds are provided when the airport can demonstrate the ability to accelerate the development and construction of a multi-phase project. The project(s) must be compatible with the Airport Master Plan and be included in the ADOT Five-Year Airport Development Program. The Matching Funds are provided to meet the local matching fund requirement for securing federal airport improvement grants or other federal or state grants. The Revenue-Generating funds are provided for airport-related construction projects that are not eligible for funding under another program.

Pavement Maintenance Program

The airport system in Arizona is a multi-million dollar investment of public and private funds that must be protected and preserved. State aviation fund dollars are limited and the State Transportation Board recognizes the need to protect, and extend the maximum useful life of the airport system's pavement. The Arizona Pavement Preservation Program (APPP) has been established to assist in the preservation of the Arizona airport system infrastructure. Most general aviation airports participate in this program.

Public Law 103-305 requires that airports requesting federal AIP funding for pavement rehabilitation or reconstruction have an effective pavement maintenance management system. To this end, ADOT-Aeronautics maintains an Airport Pavement Management System (APMS). This system requires monthly airport inspections which are conducted by airport management and supplied to ADOT.

The Arizona Airport Pavement Management System uses the Army Corps of Engineers' "Micropaver" program as a basis for generating a Five-Year Airport Pavement Preservation Program (APPP). The APMS consists of visual inspections of all airport pavements. Evaluations are made of the types and severities observed, and en-

tered into a computer program database. Pavement Condition Index (PCI) values are determined through the visual assessment of pavement conditions in accordance with the most recent FAA Advisory Circular 150/5380-7, *Pavement Management System*, and range from 0 (failed) to 100 (excellent). Every three years, a complete database update with new visual observations is conducted. Individual airport reports from the update are shared with all participating system airports. The Aeronautics Division ensures that the APMS database is kept current, in compliance with FAA requirements.

Every year, the Aeronautics Division, utilizing the APMS, will identify airport pavement maintenance projects eligible for funding for the upcoming five years. These projects will appear in the State's Five-Year Airport Development Program. Once a project has been identified and approved for funding by the State Transportation Board, the airport sponsor may elect to accept a state grant for the project and not participate in the Airport Pavement Preservation Program (APPP), or the airport sponsor may sign an Inter-Government Agreement (IGA) with the Aeronautics Division to participate in the APPP.

Innovative Funding Sources

As a result of scarcities in traditional federal, state, and local funding sources, consideration might be given to various non-traditional sources of funds available from other federal government departments. These funds are typically used to leverage existing local funds in support of the project. Strong community support and political experience are necessary for these sources to come to fruition. Examples of federal programs that have been successfully used to provide non-traditional funding for airport development projects include:

- Community Development Block grants and loans through the U.S. Department of Housing and Urban Development (HUD)

- Economic Development Assistance (EDA) grants and loans through the U.S. Department of Commerce, Economic Development Administration

- Rural Economic Development grants and loans through the U.S. Department of Agriculture (USDA)

In addition to these federal programs, there may be other state and local programs that should be examined as potential avenues for project funding. While estimating funding from innovative funding sources is not quantified in this analysis, successfully acquiring funding from these sources and leveraging local or private funding against those grants or loans could significantly reduce the funding burden of both local and private funding sources.

One additional funding source is available but requires significant action by political representatives. On occasion, airport development projects have been included as a line item in the federal budget. It would require

the support of the U.S. congressional representative for the Maricopa area and both U.S. Senators from Arizona. It should be noted, however, that this option can be problematic. In most cases, the addition to the AIP bill does not carry with it a national discretionary funding allotment. In the past, the regional FAA offices have been unable to provide ADOT additional discretionary funds as other regional airports have utilized all available. If the City were to pursue this option, an attempt should be made to have FAA provide the grants from national discretionary funds, not regional discretionary funds. All other resources should be explored and exhausted prior to pursuing this option.

Local Funding

Table 2K summarized the eligibility of the airport development for state and federal funds. The balance of project costs, after consideration has been given to grants, must be funded through local resources. The goal for the operation of any airport is to generate ample revenues to cover all operating and maintenance costs, as well as the local matching share of capital expenditures. On a national level, most general aviation airports do not fully meet this goal. Due to higher levels of activity, general aviation airports in the greater Phoenix metropolitan area tend to have a better opportunity for reaching self-sufficiency at least from an operating perspective.

There are several alternatives for local financing options for future development at the airport, including airport revenues, direct funding from the City, issuing bonds, and leasehold financing. These strategies could be used to fund the local matching share, or complete the project if grant funding cannot be arranged.

Local funding options may also include the solicitation of private developers to construct and manage hangar facilities. Outsourcing hangar development can benefit the airport sponsor by generating land lease revenue and relieving the sponsor of operations and maintenance costs. Private hangar development should be allowed only within the definition of the airport master plan in order to maintain an efficient airport facility layout.

Ideally, a financing package is established and airport operating income after operating expenses is utilized to retire the debt service. This section will analyze the potential for the airport to finance itself based upon a reasonable rates and charges schedule.

Table 2L provides an overview of operating revenues and expenses of other area general aviation airports for fiscal year 2005-06. These range from Buckeye Municipal Airport with 61 based aircraft to Phoenix Deer Valley Airport, the busiest general aviation airport in the country with over 1,200 based aircraft. Debt service, depreciation, and capital outlays are not included. The information was gathered from publicly published budget and financial statements of each airport sponsor.

TABLE 2L
Area Airport Operating Statistics
Fiscal Year 2005-06

	Buckeye Municipal	Casa Grande Municipal	Chandler Municipal	Glendale Municipal	Phoenix Goodyear	Phoenix Deer Valley
Airport Statistics						
Based Aircraft	61	91	449	378	198	1,250
Annual Operations (2006)	40,314	98,630	269,072	150,772	159,266	406,507
Runway Lengths (ft.)	5,500	5,200	4,840 4,401	7,150	8,500	8,208 4,500
Operating Cash Flow Fiscal Year 2006						
Operating Revenues	$295,215	$737,517	NA	$408,093	$1,725,300	$2,772,799
Operating Expenses	344,715	365,765	$955,991	552,867	1,119,900	1,726,390
Net Operating Income/Loss	($49,500)	$371,752	NA	($144,774)	$605,400	$1,046,409

Note: Operating revenues and expenses only. Does not include debt service, capital improvements, or depreciation.
Source: City Sponsor Budget and Financial Statements.

- OPERATING REVENUES

Airport operating revenues will be generated from fees and lease agreements with users of the airport and/or the airport property. Several methods are available for an airport to generate income from its use. At a general aviation airport such as considered for Maricopa, this would include fuel flowage fees, tie-down fees, land rentals, and building rentals.

Fuel flowage fees are typically charged per gallon of fuel sold by the FBOs on the airport. Typical fees range from four to 12 cents per gallon. For this analysis, a fee of 10 cents per gallon was utilized. Fuel sales were estimated to average six gallons per annual operation initially, growing to 12 gallons per operation with increasing jet traffic.

Tie-down fees are charged to based and transient aircraft using the airport's parking apron. Based aircraft are charged on a monthly basis, while transient aircraft pay an overnight parking fee. A rate of $30 per month was used for based aircraft. Overnight fees can vary depending upon the size of the aircraft, but will generally be 15 to 20 percent of the monthly fee.

Terminal building space rental is charged for office or concession space in the terminal building. A rate of $18 per square foot was assumed for leased space. It was further assumed that less than 40 percent of the space could be leased in the public terminal.

Land rentals would include both rentals for hangar development as well as in the corporate airpark. Space for T-hangar and shade hangar development was estimated at $0.15 per square foot. Space with full utilities for individual and FBO hangars was estimated up to $0.30 per square foot. Depending upon the location of the airport, there is a potential to

lease unused areas for agricultural use or other temporary uses to enhance revenue. No estimates of this type of use were utilized in this analysis. **Table 2M** summarizes the projected revenues for each of the planning horizons.

TABLE 2M
Financial Analysis
New Airport Development (2007) Dollars

	Initial Development	Intermediate Development	Long Range Development
Operating Revenues			
Fuel Flowage	$28,800	$75,600	$252,000
Tie-down Fees	11,520	16,920	45,720
Land Rentals	128,141	198,074	371,564
Terminal Rentals	14,400	26,640	73,440
Total Operating Revenues	**$182,861**	**$317,234**	**$742,724**
Operating Expenses			
Personnel Services	$100,000	$130,000	$200,000
Maintenance and Supplies	120,000	150,000	220,000
Miscellaneous	20,000	30,000	60,000
Total Operating Expenses	**$240,000**	**$310,000**	**$480,000**
Operating Income/Loss	**($57,139)**	**$7,234**	**$262,724**
Capital Improvement Financing			
Total CIP	$44,579,000	$7,394,000	$20,129,000
Federal and State Funding	43,437,600	7,183,350	19,543,125
Remaining Local Share	**$1,141,400**	**$210,650**	**$585,875**
Debt Service 20 years @ 6%			
New Debt Service	$117,067	$21,605	$60,090
Carry-over Debt Service	---	117,067	138,673
Total Debt Service	**$117,067**	**$138,673**	**$198,763**
Net Cash Flow	**($174,207)**	**($131,438)**	**$63,962**

Operating Expenses

To determine the net operating income that will be available to amortize capital improvements, operating expenses must also be considered. When added to annual capital-related costs, an estimate of the total annual airport cash requirement can be determined. In general, these expenses include items such as salaries and wages, employee benefits, utilities, maintenance, supplies, and administrative expenses.

Forecasts of operating expenditures were based upon past experience at other general aviation airports in and around the Phoenix metropolitan area. Adjustments were made based upon the size and operational levels of the proposed facility. **Table 2M** estimates airport operating expenses for each of the planning horizons.

FINANCIAL FEASIBILITY

In reviewing the operating revenues and expenses of other general aviation airports in the metropolitan area, it is evident there is a mix of operating incomes and losses. Buckeye Municipal

Airport is at the lower scale of activity and currently has an operating loss. The newest publicly owned airport in the Phoenix metropolitan area, Glendale Municipal Airport, has had a net operating loss since it opened. The deficit is continuing to decrease, however, as activity increases and space is leased.

While operating revenues were not available for Chandler Municipal Airport, the other three airports listed in **Table 2L** showed a positive operating income for FY 2006. At Casa Grande Municipal Airport, the city's operation of the fuel concession contributes to the positive operating income.

At Phoenix Goodyear Airport, the Phoenix Aviation Department also runs the fuel concession. There are also significant land and building leases with a flight training school and with a large aircraft modification company. At Phoenix Deer Valley Airport, there are two major flight schools, leases with two major FBOs, as well as revenue generated from hangars and other land leases generated by over 1,200 based aircraft.

While operating revenues increase with activity, so do expenses, albeit not proportionally. Subsequently, the ability to become a self-sustaining airport over time improves.

Table 2M presents a generalized cash flow analysis for the potential airport. The analysis determines the net operating income that would be available to assist in funding capital improvements at each horizon level. As indicated on the table, the airport is not likely to show a net operating income through its early years. Not until at least the intermediate planning horizon should operating revenues be expected to meet operating costs. Over the long range, activity should become sufficient to permit the airport to have adequate operating income to assist in funding capital improvements.

Thus, the airport sponsor will need to be prepared to subsidize the initial development and operation of the airport. Over the long term, however, the investment should begin to pay its own way and continue to provide other economic benefits to the community.

ECONOMIC BENEFITS

Revenues generated from operations at general aviation airports often do not meet the required annual expenditures to operate, maintain, and improve the facility without additional funding from the governing entity. As such, general aviation airports are often criticized for not operating at a profit, and causing a drain on local taxpayers.

When airports are perceived in this limited way, their role in attracting business and facilitating spending in the community is overlooked. It is true that a goal of an airport should be to strive for self-sufficiency; however, there are limits to the amount of revenue that can be obtained from airport users in meeting operating expenses and necessary capital costs for airport improvements. An analysis of direct and indirect impacts of airport development provides some insights into

the amount of economic activity generated by the presence of an airport.

The economics of an airport reach beyond a simple balance sheet of revenues and expenditures. Since businesses often choose to locate near transportation centers, the presence of an airport can provide a substantial benefit to the community it serves. Similar to the locational advantages of waterways and railroads of the past, airports now are considered attractors of economic development opportunities.

In 2002, the Aeronautics Division of Arizona Department of Transportation (ADOT) commissioned a study of the statewide economic impact of aviation. *The Economic Impact of Aviation in Arizona* not only studies the statewide impact but also the impact of each individual airport in the state. **Table 2N** presents the results for several area airports including Phoenix Regional Airport and the Estrella Sailport, the two public use airports in the vicinity of Maricopa. Phoenix Regional Airport was found to have a $1.4 million economic impact on the economy in 2002, while Estrella Sailport's impact was $2.9 million. The economic impact of neighboring Casa Grande Municipal Airport was $23.9 million. The combined economic impact of the nine existing public use airports in Pinal County totaled $65.4 million in 2002.

TABLE 2N
Economic Impacts of Area Public Use Airports - 2002

	Estrella Sailport	Phoenix Regional	Casa Grande Municipal	Buckeye Municipal	Glendale Municipal	Chandler Municipal
On-Airport Direct Impact						
Employment	19	4	28	35	124	160
Payroll	$720,242	$145,894	$1,074,316	$1,904,671	$4,843,339	$6,164,148
Sales	$1,619,846	$310,481	$2,535,337	$5,784,819	$11,023,290	$14,163,853
Visitor Spending						
Employment	2	6	228	68	116	203
Payroll	$33,036	$127,793	$4,523,841	$1,354,176	$2,311,021	$4,038,123
Sales	$81,235	$314,243	$11,124,120	$3,329,918	$5,682,797	$9,929,740
Total Primary Impacts						
Employment	21	10	256	103	240	363
Payroll	$753,274	$273,687	$5,598,157	$3,258,847	$7,154,360	$10,202,271
Sales	$1,701,081	$624,724	$13,659,457	$9,114,737	$16,706,087	$24,093,593
Total Impacts with Multiplier						
Employment	38	23	399	236	516	778
Payroll	$1,281,918	$601,032	$9,915,806	$7,204,437	$15,452,764	$22,445,580
Sales	$2,901,494	$1,397,500	$23,934,485	$19,283,702	$36,717,702	$53,877,443

Source: Arizona Department of Transportation

Although Buckeye Municipal and Glendale Municipal Airports have registered operating losses, the 2002 study determined their annual economic contribution to be $19.2 million and $36.7 million dollars, respectively. The projected basing potential of a new airport to serve the Maricopa airport falls within the range of these two airports. The long term operations level projected for the Maricopa airport would be comparable to that of

Chandler Municipal Airport, which had an economic impact of $53.9 million in 2002.

The airport also improves the essential services of the community, including enhanced medical care (such as air ambulance services), support for law enforcement, pest and fire control, and courier delivery of freight and mail. These services raise the quality of life for residences and maintain a competitive environment for economic development.

Studies of factors influencing the economic development consistently show that the presence of a modern airport facility has a positive impact on the pace and quality of economic growth. An efficient airport can provide a competitive edge for communities seeking corporate relocations or expansions.

Two out of every three Fortune 500 companies use private aircraft in their businesses to transport goods, materials, and personnel. The remainder often charter, lease, or employ other ownership options. Therefore, adequate general aviation facilities, properly promoted and funded, are necessary to ensure that a community fully participates in today's economy.

SUMMARY AND CONCLUSIONS

Based upon the analysis in this chapter, an airport in Maricopa appears to be feasible of further consideration. The community can expect strong population growth and the per capita income of the area is growing along with the population. These factors indicate a propensity to support general aviation ownership.

The City's growth to date has primarily been in residential and supporting commercial development with lower levels of business/industrial development. This is typical of suburban bedroom community growth. An airport can serve as a catalyst to enhance the growth of area employment to better diversify the tax base.

Based upon this analysis, an airport geared to corporate use is recommended. The airport should be planned to ultimately accommodate the full range of business jets. The location outside Class B airspace suggests that the airport will be popular for pilot training as well. Depending upon the location of the airport, facilities to support the types of recreational flying that are already present in the Maricopa area may be needed.

While much of the Maricopa area is presently undeveloped, land available for development is expected to be rapidly absorbed. If an airport is to become a reality, property on the order of 600 to 700 acres must be reserved within the next few years. There are environmental concerns in the area including floodplains, archaeological and biological resources, and public lands. These concerns, however, do not appear to be insurmountable with proper planning.

As with most general aviation airports, an airport in Maricopa cannot be expected to be self-sufficient financially for at least the first five to ten

years. As shown by other general aviation airports in and around the Phoenix metropolitan area, increased levels of activity can provide the opportunity to grow revenues to ultimately become self-sufficient.

While it would be ideal for the airport to pay for itself from the start, the indirect and intangible benefits of the facility to the community must be considered. Based upon the studies at other airports, an airport in Maricopa could expect to have an annual economic impact of over $20 million initially, growing to over $50 million in the long term. This figure does not include the impact that an airport's assistance attracting new business to the community can mean.